VOLUME, GROWTH AND YIELD

WESTERN YELLOW PINE IN IDAHO

PROGRESS REPORT

1913.

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SI
ME-1, Payette

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PROGRESS REPORT

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This project deals with the volume, growth and yield of Western yellow pine in Idaho. The data included in this report is mainly from the Salmon, Weiser, Boise and Payette Forests. The past year's work was entirely confined to the Payette Forest. Previous to last season the work on this project consisted mainly of the collection of volume data and also a small amount of growth data. In 1912, 618 trees were measured on the Boise King Placers Co. cutting on the Middle Fork of the Boise River. This number with those previously obtained, were worked up into a volume table based on 1193 trees, which is printed as Form 874-n. No work was done on the yield end of the project until 1913.

The work in 1913 consisted of measuring 187 stumps on the Carpenter Creek cutting and establishing a plot of 20 acres at the head of Poorman Creek, a tributary of the South Fork of the Payette River. The three plots established on Project Mc-2, on Carpenter Creek, were also in this project.

Original Plan

The system of obtaining yield proposed for western yellow pine is essentially the one outlined by H. H. Chapman in Forest quarterly, Vol. No. 3, pp. 458-469.

1. Assume four age classes: Unmerchantable, young timber, below 12" D.B.H.; young merchantable timber, 12" to 18"; mature timber, sound, healthy trees above 18"; and over-mature timber. If found advisable on the ground, another age class may be made comprising sizes up to 4" D.B.H. and also the mature and over-mature may be thrown into one age class.

2. Map in each of these age classes on several 20 acre plots, and tally all trees in each age class by diameter and merchantable length.

3. From the estimates of the age classes excluding the very suppressed trees, find the average volume of the remaining trees in each age class, the average diameter by the method of averaging basal areas. This will give a tree of the average diameter and average volume for the age class. By eliminating the suppressed trees, we have obtained a normal average tree. The age of the stand may then be obtained from local growth tables for the locality in question. Sufficient growth data for this purpose may be obtained from stump analyses of perhaps 100 to 150 stumps, where old cuttings exist near the stand measured. Otherwise, an approximate age for each class may be obtained by cutting two or three average trees in each age class, or by applying the general growth tables for the region.

4. The area occupied by each age-class is obtained from the maps by planimeter. Then the total volume, including suppressed trees in each age-class is calculated from the

estimates. The total volume in board feet of each class is divided by the area in acres of that class. Thus the stand per acre for each class is obtained, and the age of the whole class is assumed to be exactly the average obtained in (3).

5. Where two or more age-classes are intermingled in a single group of trees in such a manner that the different classes cannot be mapped separately, then the proportionate ground space occupied by each class may be obtained from the approximate crown space occupied by average trees of each class. The space occupied by each tree is assumed to be proportional to the crown area. Then the relative crown areas of the different classes are obtained. Thus it is determined that the crown of an average young merchantable tree is 2.5 times the size of the crown of an unmerchantable tree. Then, if there are 10 trees of each class mingled together on 3.5 acres, it is assumed that 1 acre is occupied by unmerchantable trees and 2.5 acres by young merchantable trees.

In this way an average yield per acre for each of four different age-classes is obtained from each plot. Different plots will show different ages for the different classes, depending upon the average volumes and diameters obtained for each class. From these figures, obtained on a number of large plots, a curve of yield per acre, based on age may be prepared. A table so constructed will be particularly applicable to stands of timber managed under a group or selection system of cutting.

Locality: It is planned to do this work on the Payette Forest and so far as possible in connection with the study of methods of cutting Western Yellow pine (Mc-2, D-4, Payette).

Idaho Yellow Pine Region.

Yellow pine in the Idaho part of the District is confined to a relatively small area in the northwest part. It occurs on seven Forests, but is practically restricted to five. The Sawtooth and Challis Forests having but small amounts in the western portions. A rough estimate shows the entire amount to be approximately six and one-half billion feet.

The yellow pine type in this part of the District is the lowest of any in altitudinal distribution. It ranges from about 3,000 to 6,500 feet, and is the best developed over most of the area between 4,000 and 5,000 feet elevation. Stands, however, yielding as high as 45,000 feet have been reported at the upper limit of 6,500 feet altitude.

This type occurs as pure stands on southern slopes, benches and ridges. On the northern slopes and in basins it is usually mixed with Douglas fir, and along streams and especially moist situations to a slight extent with Engelmann Spruce. Along the upper limits lodgepole pine is often associated to a considerable extent, but the most striking mixtures of lodgepole pine are due to old fires. In certain parts, particularly on the Idaho Forest, western larch is mixed to some extent

and sometimes lowland fir.

Although this type is the most accessible of any, utilization has not progressed extensively. The oldest cuttings are confined to the stands along drivable streams and to the isolated groups of timber near the settlements. No large tracts have been cut over, although cutting has been locally heavy at certain points where mines or settlements are located. The type as a whole is practically untouched. Plans are under way for extensive cutting on the Payette River on the Middle and South Forks, and as the Idaho & Northern Railway will reach Payette Lakes this summer, the North Fork will be readily accessible both by rail and water and extensive cutting may therefore be expected on the Payette River and likely will soon be under way on all Forks.

In the vicinity of Meadows, on the Weiser Forest, extensive cutting in this type on private lands near the Forest has been done. Several saw mills have been put up and it is probable that this cutting will soon extend to the Forest stands in that vicinity. Outside of these points cutting in the yellow pine in this region will not take place for some time.

As a rule advance reproduction is ample on the northern slope, benches and other moist situations in this type. It is usually distributed both by dense groups and scattering single trees, and would be sufficient to replace the stand

in many places were the mature stand clear cut. On ridges, southern slopes and other dry sites reproduction is not abundant and in many places is entirely absent. It catches fairly well and seedlings become two or three years old when an especially dry year kills it out. In many places on southern slopes it forms small groups under the protection of the large trees, but it is not always found even in these protected places.

The damages to which yellow pine is most subject are bark beetle, mistletoe and fire. A great many small areas of old bark beetle injuries may be seen in any part of the type, and in some places, particularly on the Weiser Forest, they are working on scattered trees. No very extensive tracts have been killed out by the beetle unless it is on the Payette Forest, where old tracts have been reported. Mistletoe injury is relatively slight in this species. It is found affecting a great many trees in the western part on the Weiser, Idaho and Payette Forests, but rarely kills the tree it attacks. In the eastern part of the region, on the Salmon Forest particularly, yellow pine seems to be free from this trouble.

Fire is perhaps the most conspicuous injury in this type. However it rarely wipes out mature stands. The damage is confined practically to killing of the seedlings and smaller saplings which have become well established under the mature stands and in the openings. For this reason there

are areas on which reproduction is almost entirely lacking. The mature trees are, however, damaged by fire scars which become deeper and deeper each succeeding time, finally failing the tree and destroying it. A great many board feet are thus destroyed during a rotation.

Intensive Reconnaissance

Cruising has been done on the following watersheds: Weiser Forest: Man Creek, Mud Creek, West Fork of Weiser River, Beaver Creek and vicinity, also in the vicinity of Hitt Mountain. Idaho Forest: Goose Creek. Payette Forest: South and Middle Forks of the Payette River and a small area on lower North Fork of the Payette River. Salmon Forest: Small areas on each of the following: Wagonhammer Creek, Goose Creek and Sage Creek. Boise Forest: South Fork of the Payette River and North Fork of the Boise River.

Volume

The following volume tables have been prepared: Form 874-n, and one volume table made from the tie cutting on Elk Creek, Boise Forest, and a table showing the relation between inside stump diameter and outside breastheight diameter, Weiser Forest.

Table 1.
Form 874-n
1913

WESTERN YELLOW PINE
(Pinus ponderosa)

Boise, Salmon and Weiser National Forests, Idaho.

E. R. Hodson | Curved | Scribner Decimal C

Diameter Breast-High	Number of 16 Foot Logs									Basis
	2	3	4	5	6	7	8	9	10	
	Volume - Board Feet in Tens									
Inches										Trees
12	8	11	-	-	-	-	-	-	-	-
13	9	12	-	-	-	-	-	-	-	-
14	10	14	-	-	-	-	-	-	-	3
15	10	16	21	-	-	-	-	-	-	5
16	11	18	24	30	-	-	-	-	-	11
17	12	20	27	34	-	-	-	-	-	25
18	13	22	31	39	-	-	-	-	-	38
19	15	25	34	44	52	-	-	-	-	48
20	18	28	38	48	57	-	-	-	-	56
21	20	32	42	53	62	74	-	-	-	66
22	22	36	47	58	70	82	-	-	-	94
23	25	40	53	65	79	92	-	-	-	84
24	28	44	58	72	86	101	-	-	-	78
25	-	48	64	79	94	110	-	-	-	109
26	-	54	70	87	103	120	-	-	-	73
27	-	60	77	94	112	130	-	-	-	76
28	-	66	84	102	121	141	162	-	-	68
29	-	-	91	110	129	152	177	-	-	71
30	-	-	99	118	138	162	188	-	-	41
31	-	-	108	127	149	174	202	-	-	36
32	-	-	116	137	160	186	218	-	-	37
33	-	-	-	147	171	199	232	-	-	21
34	-	-	-	158	183	212	250	-	-	22
35	-	-	-	169	194	224	266	-	-	26
36	-	-	-	180	207	238	280	-	-	18
37	-	-	-	192	219	254	298	354	-	24
38	-	-	-	203	232	268	314	372	-	11
39	-	-	-	-	248	285	333	396	-	13
40	-	-	-	-	264	302	352	417	510	14
41	-	-	-	-	280	320	371	441	532	7
42	-	-	-	-	299	336	393	466	556	3
43	-	-	-	-	-	355	416	493	588	3
44	-	-	-	-	-	372	440	528	622	4
45	-	-	-	-	-	393	469	560	664	2
46	-	-	-	-	-	413	495	594	701	-
47	-	-	-	-	-	435	523	625	737	3
48	-	-	-	-	-	457	553	654	768	1
49	-	-	-	-	-	-	586	688	801	-
50	-	-	-	-	-	-	620	725	840	2
										1,193

Diameter inside bark of top, 8 inches.

Table 2

Number of Ties Sawed
from different sized
16 foot logs
Western Yellow Pine
Elk Creek, Boise National Forest

1911

Curved

Diameter inside bark at top end of 16 foot log. Inches	Number of ties to log 7" x 9" x 8'
10	2
11	2
12	2
13	2
14	2
15	2
16	3
17	3
18	4
19	5
20	5
21	6
22	7
23	8
24	9
25	10
26	10
27	11
28	12
29	14
30	15
31	17
32	18
33	19
34	20
35	21
36	23
37	25
38	27
39	29
40	31

Based on 119 logs. Of the total product 25.5% was boards and 74.5% ties 7" x9" x 8'.

The actual amount of the total product of boards and ties sawed out was 22.2% higher than the log scale by the Scribner Decimal Rule,- an overrun of 22.2%. Data obtained by Dana Parkinson.

TABLE 3.

Relation of Diameter Inside Bark on Stump

to

Diameter Outside Bark at Breastheight

Western Yellow Pine

Weiser National Forest

D.B.H. Classes	Increase of Diameter inside bark on stump over diameter outside bark at D.B.H.	Average Height of Stump	Basis
Inches	Inches	Feet	No. of Trees
35 and over	.40	1.7	14
30 to 34.9	.41	1.6	34
25 to 29.9	.52	1.5	67
Less than 25	.72	1.4	65
TOTALS	2.05	6.2	180
Averages	.51	1.5	45

Growth

The following growth tables are based on stump counts on the Payette National Forest and have been separated into the following classes: Sapling Class, 4 inches D.B.H. and under; Immature Class, 5 inches to 12 inches D.B.H.; Young Merchantable Class, 12 inches to 18 inches, D.B.H. inclusive; Mature Class, 18 inches to 36 inches D.B.H. inclusive; Over Mature Class, 36 inches and over, D.B.H.; and a table in which all of these classes have been combined based on age, and a similarly combined table based on diameter.

TABLE 4.

GROWTH OF YELLOW PINE

Sapling Class

4" D.B.H. and under

Payette National Forest

Age on Stump Years	Diameter on Stump Inches	Basal Area on Stump Sq. Feet	Annual Increment %	
			Diameter	Basal Area
10	.6	.002	--	--
20	1.8	.02	10.0	16.4
30	4.4	.11	8.4	13.9
40	6.8	.25	4.3	7.8

Basis 40 Trees

Carpenter Creek, Altitude 3,700 Feet.

TABLE 5

GROWTH OF YELLOW PINE

Immature Class

(5" to 12" D.B.H. Inclusive)

Payette National Forest

Age of Stump Years	Diameter on Stump Inches	Basal Area on Stump Sq. Feet	Annual Increment %	
			Diameter	Basal Area
10	1.0	.01	--	--
20	3.8	.08	11.7	15.6
30	5.4	.16	3.5	6.7
40	6.8	.25	2.3	4.4
50	8.0	.35	1.6	3.3
60	9.0	.44	1.2	2.3
70	10.0	.55	1.1	2.2
80	11.0	.66	1.0	1.8
90	12.0	.79	.9	1.8
100	13.0	.92	.8	1.6

Basis, 39 Trees, Carpenter Creek, Altitude 3,700 Feet.

TABLE 6

Young Merchantable Class

(12" to 18" D.B.H. Inclusive)
Payette National Forest

Age of Stump Years	Diameter on Stump Inches	Basal Area on Stump Sq. Feet	Annual Increment %	
			Diameter	Basal Area
10	1.8	.02	--	-
20	3.6	.07	6.7	11.1
30	5.4	.16	4.0	7.8
40	7.2	.28	2.9	5.5
50	8.8	.42	2.0	4.0
60	10.4	.59	1.8	3.4
70	12.0	.79	1.4	2.9
80	13.6	1.01	1.3	2.4
90	15.0	1.23	1.0	2.0
100	16.3	1.45	.8	1.6
110	17.4	1.65	.7	1.3
120	18.4	1.85	.6	1.1

Basis, 30 Trees, Carpenter Creek, Altitude 3,700 Feet.

TABLE 7

GROWTH OF YELLOW PINE

Mature Class

(18" to 36" D.B.H. Inclusive)

Payette National Forest.

Age of Stump Years	Diameter on Stump Inches	Basal Area on Stump Sq. Feet	Annual Increment, %	
			Diameter	Basal Area
10	2.0	.02	--	--
20	4.0	.09	6.7	12.7
30	5.9	.19	3.8	7.1
40	7.8	.33	2.8	5.4
50	9.7	.51	2.2	4.3
60	11.6	.73	1.8	3.6
70	13.4	.98	1.4	2.9
80	15.1	1.24	1.1	2.3
90	16.8	1.54	1.1	2.1
100	18.4	1.85	.9	1.8
110	19.9	2.16	.8	1.5
120	21.3	2.47	.7	1.3
130	22.6	2.79	.6	1.2
140	23.8	3.09	.5	1.0
150	24.9	3.38	.5	.9
160	25.9	3.66	.4	.8
170	26.9	3.95	.4	.8
180	27.8	4.22	.3	.7
190	28.6	4.46	.3	.6
200	29.4	4.71	.3	.6
210	30.2	4.97	.3	.5
220	30.9	5.21	.2	.5
230	31.5	5.41	.2	.4
240	32.1	5.62	.2	.4
250	32.7	5.83	.2	.4
260	33.3	6.05	.2	.4
270	33.9	6.27	.2	.4
280	34.5	6.49	.2	.3
290	35.0	6.68	.1	.3
300	35.5	6.87	.1	.3

Basis 39 Trees, Carpenter Creek, Altitude 3,700 Feet.

TABLE 8

GROWTH OF YELLOW PINE

Over-mature Class

(36" D.B.H. & Over)

Payette National Forest

Age of Stump Years	Diameter on Stump Inches	Basal Area on Stump Sq. Feet	Annual Increment %	
			Diameter	Basal Area
10	2.4	.03	--	--
20	4.6	.12	6.3	12.0
30	6.8	.25	3.9	7.0
40	9.0	.44	2.8	5.5
50	11.2	.68	2.2	4.3
60	13.2	.95	1.6	3.3
70	15.2	1.26	1.4	2.8
80	17.2	1.61	1.2	2.4
90	19.0	1.97	.9	2.0
100	20.8	2.36	.9	1.8
110	22.6	2.79	.8	1.7
120	24.4	3.25	.8	1.5
130	26.0	3.69	.6	1.3
140	27.6	4.15	.6	1.2
150	29.2	4.65	.6	1.1
160	30.6	5.11	.5	.9
170	32.0	5.59	.4	.9
180	33.4	6.08	.4	.8
190	34.6	6.53	.4	.7
200	35.8	6.99	.3	.7
210	36.8	7.39	.3	.6
220	37.8	7.79	.3	.5
230	38.6	8.13	.2	.4
240	39.4	8.47	.2	.4
250	40.0	8.73	.2	.3
260	40.6	8.99	.2	.3
270	41.2	9.26	.1	.3
280	41.6	9.44	.1	.2
290	42.0	9.62	.1	.2
300	42.3	9.76	.1	.1
310	42.6	9.90	.1	.1
320	42.9	10.04	.1	.1
330	43.1	10.13	.05	.1
340	43.3	10.23	.05	.1
350	43.5	10.32	.05	.1
360	43.7	10.42	.05	.1
370	43.8	10.46	.02	.05
380	43.9	10.51	.02	.05
390	44.0	10.56	.02	.05
400	44.1	10.61	.02	.05

Basis , 40 Trees. Carpenter Creek, Altitude 3,700 Ft.

TABLE 9

GROWTH OF YELLOW PINE

All Classes

Payette National Forest

1914.

Age of Stump Years	Diameter on Stump Inches	Basal Area on Stump Sq. Feet	Annual Increment Percent Basal Area
10	.6	.002	--
20	1.7	.02	16.4
30	4.3	.10	13.3
40	6.0	.20	6.7
50	7.6	.32	4.5
60	9.3	.47	3.8
70	11.0	.66	3.4
80	12.8	.89	3.0
90	14.6	1.16	3.6
100	16.2	1.43	2.1
110	17.9	1.75	2.0
120	19.5	2.07	1.7
130	21.0	2.41	1.6
140	22.6	2.79	1.5
150	24.1	3.17	1.2
160	25.6	3.57	1.2
170	27.2	4.04	1.2
180	28.7	4.49	1.1
190	30.2	4.97	1.0
200	31.7	5.48	1.0
210	33.2	6.01	.9
220	34.6	6.53	.8
230	36.0	7.07	.7
240	37.3	7.59	.5
250	38.6	8.13	.4
260	39.9	8.68	.3
270	41.2	9.26	.3
280	42.4	9.81	.2
290	43.6	10.37	.1
300	44.7	10.90	.05
310	45.8	11.44	.05
320	46.9	12.00	.05
330	48.0	12.57	.05
340	49.1	13.15	.05
350	50.0	13.64	.05

Basis, 187 trees, Carpenter Creek, Altitude 3,700 Feet.

TABLE 10

GROWTH OF YELLOW PINE

Based on Diameter.

Fayette National Forest

1914

Diameter Inside bark on Stump Inches	Age on Stump Years	Number of Years to grow an Inch	Annual Increment % Basal Area on Stump
1	14	14	--
2	21	7	17.4
3	25	4	21.5
4	29	4	14.3
5	34	5	8.7
6	40	6	5.9
7	46	6	5.0
8	52	6	4.2
9	58	6	3.8
10	64	6	3.7
11	70	6	3.0
12	76	6	3.0
13	81	5	3.0
14	87	6	2.5
15	93	6	2.3
16	99	6	2.0
17	105	6	2.0
18	111	6	1.9
19	117	6	1.8
20	123	6	1.7
21	130	7	1.5
22	136	6	1.5
23	143	7	1.5
24	149	6	1.4
25	156	7	1.4
26	162	6	1.1
27	169	7	1.1
28	176	7	1.0
29	182	6	1.0
30	189	7	1.0
31	195	6	.9
32	202	7	.9
33	209	7	.9
34	216	7	.9
35	223	7	.8
36	230	7	.8
37	240	10	.6
38	255	15	.3

Table 10, continued

Diameter Inside bark on stump Inches	Age on Stump Years	Number of Years to grow an Inch	Annual Increment % Basal Area on Stump
39	270	15	.3
40	287	17	.3
41	307	20	.2
42	329	22	.2
43	355	26	.2
44	381	26	.2
45	412	31	.1
46	447	35	.1
47	485	38	.1
48	524	39	.1
49	563	39	.1
50	603	40	.1

Basis, 187 Trees, Carpenter Creek, Altitude 3,700 Feet/

Yield

Table 11 shows the approximate present stand on the seven Forests in the Idaho yellow pine region. It is a rough estimate but the best which can be obtained covering the whole area at the present time. Five of the Forests in the group show yellow pine to form one-fourth to one-third of the entire stand, and the total for the region is 6,489,737 M. feet B.M., on an approximate area of 1,725,248 acres, giving an average stand on this basis of 3,700 feet per acre.

TABLE 11.

Yellow Pine Forests

In Idaho

District 4.

Forest	Approximate Acreage	M. Feet B.M.	Percent of total stand based on Volume feet B.M.
Payette	566,988	2,350,000	34.4
Salmon	532,300	1,321,000	28.3
Boise	341,811	1,240,737	34.8
Idaho	82,944	972,000	25.5
Weiser	173,890	550,000	36.4
Sawtooth	19,507	39,000	4.5
Challis	7,808	17,000	1.6
Totals	1,725,248	6,489,737	29.1

Average stand 3,704 board feet per acre.

In the yield tables, Table 12 compares the yield of the present stand by four different methods. Chapman's, based both on mean annual increment and current annual increment. Hufnagl's , based on current annual increment and the diameter class method, also based on current annual increment. Meyer's method, based on both growing stock and mean annual increment; also giving the present cut as determined on the ground.

Table 13, compares Chapman's and Hufnagl's increment methods.

Table 14 gives the normal yield based on diameter classes and was arrived at by use of the crown area and an arbitrary reduction factor.

The following are a number of tables comparing the Chapman and Hufnagl methods for each plot. The crown areas and basal areas are compared in the following set of tables with a summary table showing the comparison for all plots combined.

A description of conditions on each of the Forests in this group follows the tables.

TABLE 12.

Comparison of the Determination of Yield of Present Stand by Different Methods
Payette National Forest
Western Yellow Pine
Carpenter and Poorman Creeks

Plot Number	Average Stand per Acre	Yield per Acre for 50 Year Period					Present Cut per Acre determined on the ground	
		Chapman's Method		Hufnagl's Method by Current Annual Increment	Hufnagl's Method by Diameter Classes (Current Annual Increment	Heyer's Method by Growing Stock and Increment (Mean Annual		
		Mean Annual Increment	Current Annual Increment					
	Ft. B.M.	Feet B.M.	Feet B.M.	Feet B.M.	Feet B.M.	Feet B.M.	Feet B.M.	
							Amount	%
Mc-2 #1	14,346	4,069	7,024	6,385	9,893	10,042	11,286	79
Mc-2 #2	16,484	4,126	6,214	6,331	11,320	12,363	15,392	93
Mc-2 #3	20,164	4,663	6,470	6,545	13,524	15,123	18,154	91
ME-1 #1	15,119	4,193	7,087	7,442	11,076	11,284	11,347	75
Averages	15,897	4,233	6,864	6,993	11,382	11,923	12,889	81

TABLE 13.

Chapman & Hufnagl's (Increment) Methods Compared
Variations in Annual Increment and Growth per cent
Payette National Forest
Western Yellow Pine
Carpenter and Poorman Creeks

Plot Number	Area Acres	Total Stand per plot FT. B.M.	Average Stand per Acre Feet B.M.	Percent of tot. area occupied by crowns of trees above 4" D.B.H.	Annual Increment per Acre: Chapman Method: Mean Annual Ft.B.M.	Annual Increment per Acre: Chapman Method: Current Annual Ft.B.M.	Annual Increment per Acre: Hufnagl Method based on Current Annual Increment, Feet B. M.	Variation of Hufnagl from Chapman %: In - crease	Variation of Hufnagl from Chapman %: De - crease	Growth %: Chapman: Mean	Growth %: Chapman: Current	Growth %: Hufnagl: Current
Mc-2 #1	5	71,430	14,346	19.5	81.38	140.47	127.70	-	9.1	.57	.98	.89
Mc-2 #2	5	82,420	16,484	19.3	82.52	124.27	126.61	1.9	-	.50	.75	.77
Mc-2 #3	5	100,164	20,164	21.2	93.25	129.40	130.89	1.2	-	.46	.64	.65
ME-1 #1	20	302,380	15,119	12.8	83.87	141.73	148.44	4.7	-	.54	.94	.98
Totals	35	555,394	-	-	296315	4804.80	4,894.80	-	-	-	-	-
Averages	-	15,897	-	15.9	84.66	137.28	139.85	1.9	-	.53	.86	.87

Table 14.

Normal Yield Based on Diameter Classes
Fayette National Forest
Carpenter and Poorman Creeks

D.B.H. Inches	Crown Area Sq. Feet	No. of Trees per Acre (Maximum)	Normal Stand No. of Trees per Acre (1/3 of Maximum)	Normal Yield feet B.M.	Age Years
5	53	822	274.0	-	34
6	64	681	227.0	-	40
7	77	566	188.7	-	46
8	89	489	163.0	-	52
9	102	427	142.3	-	58
10	116	376	125.3	9,398	64
11	129	338	112.7	9,580	70
12	144	303	101.0	9,595	76
13	159	274	91.3	9,587	81
14	174	250	83.3	9,996	87
15	190	229	76.3	11,979	93
16	207	210	70.0	14,560	99
17	226	193	64.3	14,982	105
18	248	176	58.7	15,438	111
19	272	160	53.3	18,122	117
20	300	145	48.3	18,257	123
21	332	131	43.7	20,626	130
22	363	120	40.0	21,000	136
23	392	111	37.0	21,830	143
24	419	104	34.7	22,486	149
25	448	97	32.3	25,517	156
26	478	91	30.3	26,300	162
27	508	86	28.7	27,150	169
28	542	80	26.7	30,091	176
29	578	75	25.0	32,950	182
30	614	71	23.4	32,994	189
31	672	65	21.8	33,136	195
32	712	61	20.3	33,170	202

TABLE 15.

COMPARISON OF CHAPMAN AND HUFNAGL'S METHODS

Western Yellow Pine

Payette National Forest

Plot No. 1, Mc-2.

(Area 5 Acres)

Class	Per Cent of Total Area Occupied by Crowns of Each Class	Annual Increment per Acre				Percent of Variation of Hufnagl's from Chapman	
		Chapman		Hufnagl			
		Bd. Feet	Growth: Per cent	Bd. Feet	Growth: Per cent	Increase	Decrease
Immature 4" to 12" D.B.H.	5.3	3.98	3.90	3.10	3.04	--	22.1
Young Merchantable 13" to 18" D.B.H.	3.4	25.83	2.20	25.87	2.20	.2	--
Mature 19" to 36" D.B.H.	7.9	90.94	1.40	80.85	1.24	--	11.1
Over-mature Over 36" D.B.H.	2.9	19.72	.30	17.88	.27	--	9.4
TOTALS	19.5	140.47	.98	127.70	.89	--	9.1

TABLE 16 .

COMPARISON OF CHAPMAN AND HUFNAGL'S METHODS .

Western Yellow Pine

Payette National Forest

Plot No. 2., Mc-2.

(Area 5 Acres)

Class	Percent of Total Area Occupied by Crowns of each Class	Annual Increment per Acre				Percent of Variation of Hufnagl from Chapman	
		Chapman		Hufnagl			
		Bd. Feet	Growth Percent	Bd. Feet	Growth Percent	Increase	Decrease
Immature 4" to 12" D.B.H.	3.7	1.72	4.00	1.29	3.00	--	25.0
Young Merchantable 13" to 18" D.B.H.	2.6	9.84	2.00	10.16	2.07	3.3	--
Merchantable 19" to 36" D.B.H.	8.7	92.66	1.00	93.64	1.02	1.1	--
Over-mature Over 36"D.B.H.	4.3	20.05	.30	21.52	.32	7.3	--
TOTALS	19.3	124.27	.75	126.61	.77	1.9	--

TABLE 17.

COMPARISON OF CHAPMAN AND HUFNAGL'S METHODS

Western Yellow Pine

Payette National Forest

Plot #3, Mc-2

(Area, 5 Acres)

Class	Percent of Total Area Occupied by Crowns of each Class	Annual Increment Per Acre				Percent of Variation of Hufnagl from Chapman	
		Chapman		Hufnagl			
		Bd. Feet	Growth Per cent	Bd. Feet	Growth Per cent	Increase	Decrease
Immature 4" to 12" D.B.H.	1.8	.40	4.00	.30	3.00	--	25.0
Young Merchantable 13 to 18" D.B.H.	1.1	6.72	2.10	6.75	2.11	.4	--
Mature 19 to 36" D.B.H.	11.5	100.98	1.10	94.70	1.03	--	6.2
Over-mature Over 36" D.B.H.	6.8	21.30	.20	29.14	.27	34.5	--
Totals	21.2	129.40	.64	130.89	.65	1.2	--

TABLE 18.

COMPARISON OF CHAPMAN AND HUFNAGL'S METHODS

Western Yellow Pine

Payette National Forest

Plot No. 1, ME-1

(Area 20 Acres)

Class	Percent of Total Area Occupied by Crowns of Each Class	Annual Increment per Acre				Percent of Variation of Hufnagl from Chapman	
		Chapman		Hufnagl			
		Bd. Feet	Growth Per cent	Bd. Feet	Growth Percent	Increase	Decrease
Immature 4" to 12" D.B.H.	1.0	1.20	3.81	.97	3.08	--	19.2
Young Merchantable 13 to 18" D.B.H.	2.4	15.33	2.10	15.15	2.08	--	.3
Mature 19 to 36" D.B.H.	7.6	116.06	1.10	109.81	1.04	--	5.4
Over-mature Over 36" D.B.H.	1.8	9.14	.30	12.51	.41	36.9	--
Totals	12.8	141.73	.94	148.44	.98	4.73	--

TABLE ~~19~~ .

COMPARISON OF CROWN AREA AND BASAL AREA.

Western Yellow Pine

Payette National Forest

Plot No. 1, Mc-2.

(Area 5 Acres)

Class	Crown Area: Sq. Feet	Percent of Total Crown Area	Basal Area: Sq. Feet	Percent of Total Basal Area
Immature 4" to 12" D.B.H.	11,523	27.1	40.46	12.0
Young Merchantable 13" to 18" D.B.H.	7,433	17.5	55.66	16.5
Mature 19" to 36" D.B.H.	17,128	40.4	152.76	45.3
Over-mature over 36" D.B.H.	6,375	15.0	88.64	26.2
Totals	42,459	100.0	337.52	100.0

TABLE ~~20~~ .

COMPARISON OF CROWN AREA AND BASAL AREA

Western Yellow Pine

Payette National Forest

Plot No. 2, Mc-2.

(Area 5 Acres)

Class	Crown Area Sq. Feet	Percent of Total Crown Area	Basal Area Sq. Feet	Percent of Total Basal Area
Immature 4" to 12" D.B.H.	8,045	19.1	18.47	6.3
Young Merchantable, 13" to 18" D.B.H.	5,828	13.8	23.89	8.1
Mature 19" to 36" D.B.H.	18,830	44.8	163.82	55.6
Over-mature over 36"	9,393	22.3	88.35	30.0
TOTALS	42,096	100.0	294.53	100.0

TABLE 24.

COMPARISON OF CROWN AREA AND BASAL AREA.

Western Yellow Pine

Payette National Forest

Plot No. 3, Mc-2.

(Area, 5 Acres)

Class	Crown Area: Sq. Feet	Percent of Total Crown Area	Basal Area: Sq. Feet	Percent of Total Basal Area
Immature 4" to 12" D.B.H.	3,871	8.4	8.83	2.6
Young Merchantable 13" to 18" D.B.H.	2,478	5.4	15.01	4.3
Mature 19" to 36" D.B.H.	25,042	54.1	173.17	50.2
Over-mature Over 36" D.B.H.	14,860	32.1	148.17	42.9
TOTALS	46,251	100.0	345.18	100.0

TABLE ~~22~~ .

COMPARISON OF CROWN AND BASAL AREA

Western Yellow Pine

Payette National Forest

Plot No. 1. MF-1)

(Area 20 Acres)

Class	Crown Area Sq. Feet	Percent of Total Crown Area	Basal Area Sq. Feet	Percent of Total Basal Area
Immature 4 to 12" D.B.H.	8,486	7.6	59.23	4.8
Young Merchantable 13 to 18" D.B.H.	19,553	17.5	164.03	13.2
Mature 19 to 36" D.B.H.	67,427	60.5	810.55	64.9
Over-mature Over 36" D.B.H.	16,058	14.4	213.54	17.1
Totals	111,524	100.0	1,247.35	100.0

TABLE 23.

SUMMARY

COMPARISON OF CROWN AREA AND BASAL AREA

Western Yellow Pine

Payette National Forest

Plots		Crown Area	Percent of	Basal	Percent	Percent of	
Number	Area Acres	Sq. Feet	Total Crown Area	Area Sq. Feet	of Total Basal Area	Variation of Basal Area from Crown Area	
						Increase	Decrease
#1, Mc-2	5	42,459	17.5	337.52	15.2	--	2/3
#2, Mc-2	5	42,096	17.4	294.53	13.2	--	4.2
#3, Mc-2	5	46,251	19.1	345.18	15.5	--	3.6
#1, ME-1	20	111,524	46.0	1,247.35	56.1	9.5	--
TOTALS	35	242,330	100.0	2,224.58	100.0	--	--

- PAYETTE FOREST -

Over one-third of the total estimated stand of timber on the Payette Forest is yellow pine. There is estimated to be, on an approximate area of 566,988 acres, a stand of 2,350,000 board feet of yellow pine, or 34.4% of the total stand of all species on the Forest. Within a wide altitudinal range of 3,000 to 6,500 feet yellow pine is distributed uniformly over the Forest. The best development and most continuous stands are usually found from 4,000 to 5,000 feet elevation, but commercial stands are numerous above and below this belt. On the Deadwood River slopes at 6,000 to 6,500 feet elevation are small areas which run as high as 45,000 board feet per acre. The heaviest stands in the best situations will sometimes reach 60,000 to 75,000 board feet per acre.

On south slopes and ridges at 3,500 to 4,000 feet, the stands are practically pure but on most north slopes regardless of elevation there is considerable mixture, mainly Douglas fir. Yellow pine has a number of associates of which Douglas fir is the most constant and abundant. Other species associated with yellow pine are Lodgepole pine, Engelmann spruce and western larch. These latter occur under special conditions of soil moisture and the first are usually restricted to the upper limits of the type, or to stream courses. Fire, however, is a large factor in causing lodgepole to enter the type.

The formation is granite on which the species occur or one derived from this formation.

On parts of the Forest considerable utilization of the type has already taken place as the larger streams are readily drivable. Up to the present time the cutting has not been extensive compared with the amount of the species. The time now seems about ready for wholesale cutting in the type. The recent extension of the railroad from Emmett to Long Valley will be completed to Payette Lakes this season and should create more of a local demand and make more accessible the timber on the North Fork.

The seed tree method of cutting seems most adapted to this Forest, as the stands have practically everywhere sufficient advance reproduction to form a new stand. An exception to this are the south slopes with scattered trees where more careful cutting is necessary. Isolated trees should not be cut at all unless they have already served fully their purpose as seed trees and have established a group of reproduction.

In the average mature stand in the basins and northerly slopes about 75% should be cut the first time. This is too heavy a cutting to secure the highest yield when under management. The heavy cut in the present irregular stands is necessary for two reasons: First, to remove the surplus in the older age classes and second, to afford a large enough

cut for a practical logging operation under present conditions. The second of these reasons must be satisfied if any cutting is done at this time and usually it fits in well with the first.

About ten years ago (1903 to 1905) there was a serious infestation of bark beetle in yellow pine on the Payette Forest which ceased of itself. The Silver Creek and Boiling Spring areas on the Middle Fork of the Payette River are good examples of the extent and intensity of this infestation. Apparently at the present time there is no serious danger on the Forest, but scattered trees are still infested and under favoring conditions may become the source of an epidemic. On timber sales all infested trees even if only slightly affected, should be cut out. In view of the probable extensive cuttings on the Payette Watershed this should prove practically preventive of future epidemics. To make the protection doubly sure sporadic infested trees should be cut wherever possible.

Mistletoe is present but not serious and may be sufficiently controlled by removal of infested trees in cuttings.

As yellow pine forms extensive tracts on this Forest the fire danger is considerable and proper protection calls for a system of well located fire lines in addition to patrol and careful brush disposal on logged areas.

As lightning frequently sets fires in remote places lookout stations and patrol are indispensable during the danger season.

TABLE ~~84~~

Payette National Forest

Western Yellow Pine

Watershed	M. Feet B.M.
South Fork, Payette River	105,435
Middle " " "	380,595
North " " "	400,000
Deadwood River	150,000
Other parts of Forest	1,313,970
Total	2,350,000

SALMON FOREST

It is estimated that yellow pine forms 28.3 % of the total stand on this Forest or 1,321,000,000 feet B.M. The approximate area is 532,300 acres. The principal tracts are found on the Main Salmon River from Carmen Creek down, and also on North Fork, Middle Fork, Big and Camas Creeks.

The species has a wide altitudinal range of from 3,000 to 6,000 feet and is abundant from 3,500 to 5,000 feet elevation. Only on south slopes does it reach an altitude of 6,000 feet.

Many of the stands on this Forest are pure stands. On south slopes and other dry places yellow pine is always pure but on north slopes, along streams and other moist places Douglas fir forms 10 to 20% of extensive stands. Other associates are practically wanting. Along streams occasionally a few scattered Engelmann spruce occur with the pine and sometimes near the upper limits lodgepole enters into mixture. The lodgepole mixture is not extensive and the line separating that species and yellow pine is a fairly sharp one.

On this Forest yellow pine is found on some form of eruptive rock and derived formations. The most general formations are granite, porphyry, trap, quartz and schist. It is noticeable that where such rocks occur only in isolated

areas, the yellow pine is confined to them although all other conditions on the surrounding sedimentary formations are favorable.

Reproduction is in some quantity in the mature stands except south slopes but usually does not become conspicuous until the stand is opened by cutting or otherwise. Dense stands, particularly if they have not reached maturity, have little or no advance reproduction.

The striking examples of reproduction after logging are on Sawmill Gulch, a tributary of the North Fork near Gibbonsville and on Ransack Creek and Grouse Flat, tributary to Hughes Creek. In two of these places the reproduction is dense and evenly distributed but on Grouse Flat the reproduction is in compact groups due partly to unfavorable moisture conditions and to starting in the tops left from lumbering .

Yellow pine is used altogether locally on this Forest and much of the earlier cutting was done to supply the local mines. The most general use is lumber for common construction. The quality of the saw timber is excellent.

Where advance reproduction is present the seedtree method of cutting may be used to advantage in the overmature stands. In stands naturally in groups the group selection method should be used as far as possible. On south slopes

and other exposed places where advance reproduction is rarely present, only careful selection cutting should be done by single trees. Throughout the type the cutting should favor yellow pine.

Yellow pine on this Forest is remarkably free from mistletoe injury and there is little active bark beetle infestation. The old beetle work is confined to small areas not to exceed an acre in extent.

Lightning is a source of fires in this locality and therefore careful patrol is necessary in addition to other measures of fire protection. In places of particular danger the brush should be piled and burned. This method should also be followed where a heavy cutting is made on a clear forest floor as the danger is greatly increased. Where a light cutting is made on a south slope lopping is sufficient protection. The brush from a light cutting where there is much old debris on the ground does not add a great deal to the fire danger. In such a case little is accomplished in fire protection by burning the brush from the cutting unless the area is entirely cleared up of the old debris.

TABLE 25.

Salmon National Forest.

Western Yellow Pine.

Watershed	M. Feet B.M.
Carmen and Boyle Creeks	2,000
Fourth of July Creek	10,000
Wagonhammer "	11,500
Silver Lead "	4,500
North Fork, Salmon River	115,000
Sage Creek	20,000
Indian Creek	35,000
Squaw Creek	95,000
Spring and Boulder Creeks	45,000
Sheepeater Creek (Little and Big)	105,000
Between Sheepeater and Owl Creeks	80,000
Owl Creek	130,000
Between Owl and Horse Creeks	150,000
Horse Creek	100,000
Big Creek	150,000
Pine "	10,500
Between Pine and Moore Creeks	12,500
Camas Creek	95,000
Middle Fork, Salmon River	150,000
	1,321,000

TABLE 26

WESTERN YELLOW PINE

Age on Diameter

Salmon National Forest, Idaho, 1910

Diameter on Stump	Age	Time required to grow one Inch	Diameter on Stump	Age	Time required to grow one Inch	
Inches	Years	Years	Inches	Years	Years	
1	8		21	211	15	
2	17	9	22	226	15	
3	26	9	23	241	15	
4	35	9	24	258	17	
5	43	8	25	275	17	
6	52	9	26	293	18	
7	61	9	27	311	18	Based on
8	70	9	28	330	19	decade meas-
9	79	9	29	350	20	urements on
10	88	9	30	370	20	stump of 154
11	98	10	31	390	20	trees.
12	107	9	32	411	21	
13	117	10	33	434	23	
14	127	10	34	452	18	
15	138	11	35	472	20	
16	148	10	36	490	18	
17	160	12	37	510	20	
18	172	12	38	528	18	
19	184	12	39	546	18	
20	198	14	40	560	14	

Stumpheight = 18 inches.

- BOISE FOREST -

The latest estimate gives the Boise Forest 1,240,-737,000 feet B. M. of yellow pine on 341,811 acres. This is 34.8% of the total amount on the Boise. It is distributed over the entire Forest at elevations from 3,000 to 6,000 feet elevation reaching its best development at 4,000 to 5,000 feet elevation. It occurs on all the forks of the Boise River and on that portion of the South Fork Payette River drainage lying within the boundary.

Outside the Forest boundary and within it on private lands there are considerable bodies of timber which contain in all a large quantity of sawtimber. The amount, however, is not known.

The Barber Lumber Company's tracts are probably the most extensive of any one holding of privately owned timber.

The average stands run 3,000 to 5,000 bd. ft. per acre, but occasionally reach 50,000'. On the better parts on the benches and north slopes the stands run 10,000 to 20,000 per acre while on the poorer south slopes 1,000 bd. ft. per acre is the usual stand.

On the Boise Forest yellow pine may be separated into two subtypes: Pure yellow pine and mixed yellow pine.

Pure yellow pine stands usually occur upon rich flats, low hills and on exposed southern slopes. This local

occurrence is largely explained by soil moisture, the small amount not favoring associated species. It also accounts for the scattering stands especially on south slopes. On ridges north and south the west exposures have pure stands while north slopes stands are usually mixed with Douglas fir.

On the Forest there is a considerable area of pure yellow pine but no definite estimate can be given of the total amount in pure stands.

Douglas fir occurs in mixture with yellow pine mainly on north slopes and particularly at the bottoms of such slopes along the secondary streams. Moisture seems to be the determining factor and wherever the site is sufficiently moist, Douglas fir may appear even on south slopes. In many places it is evident that Douglas fir is encroaching on the yellow pine as it forms the major part of the reproduction and juvenile growth in places which were formerly pure yellow pine. As the altitude increases the fir becomes more prominent in the mixture.

Although Engelmann spruce and yellow pine differ widely in moisture and light requirements the two species occur together on limited areas. Such places are of course sufficiently moist for Engelmann spruce to develope. Many such mixed stands appear to have been where a fire originally favored the yellow pine and is slowly changing to spruce. The mixture is most common at the higher altitudes at which yellow pine occurs and in particularly moist places along streams and in basins at the heads of secondary streams.

Yellow pine is the principal sawtimber which supplies the Boise market locally. Since the forks of the Boise River are drivable there have been extensive logging operations on all of them in the past. The amount cut out is not known but the total cut since the settlement of the country must be a large quantity.

The present use of yellow pine on the Boise Forest is not important. Logging for some years has been almost at a standstill. Probably the largest operation recently was the Boise King Placer's cutting on the Middle Fork in 1912. Approximately 1,500,000 ft. B. M. was cut and the total amount will likely reach 3,000,000.

On account of the roughness of the country the only way to get the logs out is by driving. The tracts are scarcely extensive enough or connected in such a way as to permit railroad logging. The main streams are all drivable but very rough and in need of improvement.

In the Idaho region the yellow pine type is found at the lowest elevation of Forest growth. On the foothills in the sheltered places it is found as scattered trees at about 3,000 ft. elevation. The best development is usually about 4,000 or 4,500 ft. though there are frequently good stands above 5,000 ft. Douglas fir is the species most frequently mixed with yellow pine and is the type most common in the yellow pine zone, Lodgepole pine and Engelmann spruce are also associated in the upper limits and to a limited extent along streams.

The rock formation of the lower part of the yellow pine is generally lava, and in the upper part granite. On Fall Creek is a unique vesicular lava formation on which this species is well developed. Along the streams are the bars and benches which are largely loose deposits of water-worn rocks. These limited areas are very favorable to pure stands of yellow pine.

Slope of course has a great influence. The south slopes generally have pure scattered stands and north slopes have dense mixed ones. At the bottoms of the secondary streams are usually the finest trees of yellow pine, occasionally reaching a height of 160 to 170 feet. The soil should be loose and well drained.

The condition of the reproduction is illustrated by the following 7 - ¼ acre plots taken on Elk Creek:

Plot Number	Number of Trees	Age in Years	Average Height in Feet	Maximum Height in Feet
1	237	5	1.5	3
2	60	10	3.0	4
3	311	-	16.0	34
4	512	23	10.0	16
7	779	5	1.5	4

Height Growth of Seedlings:

Age in Years	Height in Inches	Age in Years	Height in Inches
3	5.5	11	22.5
4	8.0	12	25.0
5	10.5	13	27.0
6	13.0	14	29.5
7	15.0	15	31.5
8	17.0	16	34.0
9	18.5		
10	20.5		

Yellow pine is rarely subjected to a crown fire except on small areas in young dense stands. Repeated surface fires are however frequent in the type. A large per cent of the older trees are fire scarred at the base and the usual direct cause of loss is windfall due to the weakened base. Rarely do fungi enter the fire scars on account of the protection of the charred surface.

Insect infestation is commonly confined to small areas of ½ to one acre in extent. Usually the attack dies out after reaching this size, the area is burned over by one of the numerous surface fires and covered by dense thrifty reproduction. No extensive areas are known to be insect infested on the Boise at present.

Snow and ice do some damage particularly to young seedlings. The damage to larger growth is usually on steep slopes where avalanches run.

The seed tree method is generally applicable to the more favored sites of yellow pine on the Boise. Practically all the north slopes may be cut by this method since they are well protected and abundant advance reproduction is present. Where the reproduction and young growth occurs in groups the group selection method may be used. On south slopes as a rule the cutting should not be so heavy. Soil protection is usually much needed and reproduction is scarce. The selection method will therefore apply here to best advantage.

TABLE 27.

Boise National Forest

Western Yellow Pine

Watershed	M. Feet B.M.
South Fork, Payette River	247,810
Moore's Creek	116,100
North Fork, Boise River	174,100
Middle " " "	262,900
South " " "	349,500
Other Parts of Forest	90,327
Total	1,240,737

TABLE 28 .

GROWTH OF WESTERN YELLOW PINE

BOISE NATIONAL FOREST

Elk Creek

Age on Stump Years	Diameter Inside Bark on Stump Inches	Basal Area on Stump Sq. Ft.	Percent of Increase in Basal Area	Diameter Inside Bark on Stump Inches	Age Years	Years Required to grow an inch	% of Increase in Basal Area
10	2.0	.02	--	1	5	5	--
20	4.0	.09	12.7	2	10	5	12.1
30	6.1	.20	7.6	3	15	5	17.1
40	8.1	.36	5.7	4	20	5	11.4
50	10.2	.57	4.5	5	25	5	8.7
60	12.3	.83	3.7	6	30	5	7.1
70	14.3	1.12	3.0	7	35	5	6.0
80	16.4	1.47	2.7	8	39	4	5.6
90	18.1	1.79	2.0	9	44	5	4.6
100	19.5	2.07	1.4	10	49	5	4.4
110	20.7	2.34	1.2	11	54	5	3.6
120	21.9	2.62	1.1	12	59	5	3.6
130	23.1	2.91	1.0	13	64	5	3.0
140	24.3	3.22	1.0	14	68	4	3.0
150	25.5	3.55	1.0	15	73	5	2.8
160	26.7	3.89	.9	16	78	5	2.6
170	27.9	4.25	.9	17	83	5	2.4
180	29.1	4.62	.8	18	89	6	1.9
190	30.3	5.01	.8	19	96	7	1.5
200	31.5	5.41	.8	20	104	8	1.3
210	32.4	5.73	.6	21	112	8	1.2
220	33.1	5.98	.4	22	121	9	1.0
230	33.6	6.16	.3	23	129	8	1.0
240	34.1	6.34	.3	24	138	9	1.0
250	34.6	6.53	.3	25	146	8	1.0
260	35.1	6.72	.3	26	154	8	1.0
270	35.6	6.91	.3	27	163	9	.9
280	36.1	7.11	.3	28	171	8	.9
290	36.6	7.31	.3	29	179	8	.9
300	37.1	7.51	.3	30	188	9	.8
310	37.6	7.71	.3	31	196	8	.8
320	38.1	7.92	.3	32	205	9	.7
				33	219	14	.4
				34	239	20	.3
				35	259	20	.3
				36	279	20	.3
				37	299	20	.3
				38	319	20	.3

Basis 91 Trees

Altitude 4,200 Feet.

IDAHO FOREST

Yellow pine on this Forest forms but one-fourth of the total estimated stand or 25.5%. In round numbers there is 972,000,000 feet B.M. on an approximate area of 82,944 acres. It is not distributed generally over the Forest but is found in quantity in some five or six centers. There are two extensive tracts on the Middle Fork of the Salmon River, upper and lower, the latter extending down the main Salmon River; several smaller tracts on Chamberlain Creek; a tract on Goose Creek and several other smaller tracts on Hazard Creek, Lake Fork and tributaries of Big Creek. Not a great deal is known of some of these areas as they are in remote country.

The altitudinal range of yellow pine on this Forest is from 4,000 feet to 5,500 feet; in extreme cases it is found up to 6,000 feet elevation.

The general formation on which yellow pine occurs in this locality is granite. On the lower part of Goose Creek the lava formation extends from the west but so far as known it is not found on any other part of the Idaho Forest.

On this Forest yellow pine has a number of associates. There is a tendency here for species having widely different requirements to mix to a considerable extent. The most common associate is Douglas fir, with aspen and lodgepole pine on the burned areas. Western larch is found in

in mixture to some extent but it usually occurs in small pure stands in with the pine. Lowland fir is another species mixed to a considerable degree in the yellow pine, more especially at the upper limits where Engelmann spruce also may be found as an associate.

Very little cutting is done in yellow pine. The tracts tributary to Payette Lakes and Meadows are the only ones in which operations would be practicable at the present. The chief product will be lumber.

In the management of Yellow pine, on this Forest, there are two classes of stands to handle, i.e. mixed stands and pure stands. The mixed stands are greatly in the majority; the pure stands are limited to small areas where conditions are particularly favorable. A principal feature, therefore, of the cutting will be the favoring of yellow pine over other species in mixture. This should be done only where there is a reasonable chance of increasing the proportion of yellow pine. On sites where yellow pine has become established only through some accidental factor and it is obvious that this species cannot be maintained even when favored by cutting, no attempt should be made to do so. On such sites, even though yellow pine is present in considerable quantity, cutting should favor the one or two species best adapted to form the stand under those conditions.

Ordinarily the seed tree and selection methods will apply on the Idaho Forest; the former on north slopes and basins, the latter on south slopes and ridges. The only other method is the shelterwood compartment which might be desirable in certain types of stands on north slopes.

This Forest has valuable stands of yellow pine which should be especially considered in any protection plan against fire and other dangers.

On the South Fork of the Salmon River there is a bark beetle infestation of limited extent in yellow pine. Only single trees and small groups are infested and the damage is increasing but slowly.

Mistletoe does some damage but the aggregate amount is not large.

TABLE 29 .

Idaho National Forest

Western Yellow Pine

Watershed	M. Ft. B.M.
Payette River Watershed	
Tributary and adjacent to Payette Lakes and Long Valley	2,000
Salmon River Watershed	
Little Salmon River adjacent to Meadows	100,000
South Fork, Salmon River	160,000
Middle Fork, Salmon River	50,000
Big Salmon River and Chamberlain Basin	600,000
Other parts of Forest	60,000
Total	972,000

WEISER FOREST

Over one-third of the total estimated stand on this Forest is yellow pine. The amount in board measure is 550,000,000 feet which is 36.4% of the total stand of all species on the Forest. The approximate area is 173,890 acres. In the strictly yellow pine area 50 to 60% of the stand is yellow pine. The species is found in quantity in all parts of the Forest except the portions too high; as Cuddy and Hitt Mts., those in the eastern part and the Seven Devils Mountains in the northeast. The most extensive tracts are found north and northeast of Evergreen towards the Seven Devils region.

Yellow pine on this Forest is largely in practically pure stands. 55% is in stands with little mixture. The purest stands usually occur on the south slopes and on the drier sites.

The altitudinal range is from 3,500 to 5,500 feet on the south and west slopes where it is found in largest quantities. On this Forest it is not common on steep north slopes.

Douglas fir is the most characteristic associate of Western yellow pine. As the northern part of the Forest

is reached it is noticeable that there is a tendency to more general mixtures. Lowland fir, Engelmann spruce and lodgepole pine come in on sites favoring them, the last being limited mostly to stream borders.

Practically over the entire Forest where yellow pine is found the formation is lava. The few exceptions are granite and quartz. As lava breaks down into an extremely rich soil, the soil factor is favorable to reproduction and forage.

Local utilization of yellow pine on this Forest has reached a considerable extent. On Mann Creek, Cottonwood, Shingle Flat, Evergreen and elsewhere, there has been considerable cutting in yellow pine. It is used mostly for lumber and railroad ties. Minor uses are for fence posts, cordwood, etc. In the vicinity of Tamarac several sawmills have operated on private stumpage which is largely more accessible than the Forest stands. When the more accessible privately owned stands are cut out it is reasonable to expect that the demand for Forest stumpage will increase.

As growth on this Forest, so far as it has been investigated, seems more rapid than on the neighboring Forests, it may be possible to use a 150 year rotation. This rotation would apply to the northern part of the Forest, particularly to that section of the Forest on the upper Weiser River. It is doubtful whether a shorter rotation than 200 years could

be used on the southern part of the Forest where conditions do not appear so favorable for growth.

On the older cuttings made 20 to 30 years ago, reproduction is abundant. It is grouped to some extent which is not unusual for this species. The recent cuttings on the timber sale areas do not show much reproduction compared with the older cuttings or generally throughout the Forest. This is probably due to the lack of a seed year when the moisture conditions are sufficiently favorable.

In the management of yellow pine stands on this Forest the selection system has been used with a minimum diameter limit. It would seem that in the northern part, where reproduction is usually responsive to opening the stand and particularly where advance reproduction is present, the seed tree method could be safely used. This method is advisable in the overmature stands where it does not affect soil or reproduction conditions too radically. In the more unfavorable sites the selection method by single trees or by groups should be practiced.

There is some scattered insect damage to this species although the serious infestations are in lodgepole pine. At one time it was thought that bark beetle injury to yellow pine on this Forest was on the increase. The past damage has reached as high as 2 to 5% of the merchantable stands on Crooked River, Surprise Creek and Duke's Creek. After more careful investigation it was evident the infestation was stationary or decreasing.

Mistletoe is common on yellow pine and seems to be spreading. It retards growth on the older trees and deforms young trees. In severe cases the trees are killed. Wherever possible the affected trees should be cut out. This should be done on all sale and free use areas and if practicable incipient attacks of small size should be cut out even if utilization is not possible.

Fire has done a great deal of damage to this type in the past. Large burns are frequent but are usually re-stocked. No special fire protection is necessary.

TABLE 30.

Weiser National Forest

Western Yellow Pine

Watershed	M. Feet B.M.
Mann Creek and Tributaries	25,000
Stugil Creek " "	4,000
Cottonwood Creek (16 N. 6 W.) and Tributaries	1,000
Keithly Creek and Tributaries	1,000
Pine Creek and "	28,000
Brownlee Creek " "	12,000
Dukes Creek " "	3,000
Rush Creek " "	1,000
Goodrich Creek " "	3,000
Johnson " " "	15,000
Hornet " " "	18,000
Little Weiser River "	40,000
Grays Creek " "	1,000
Middle Fork, Weiser River	30,000
Cottonwood Creek (16 N. 1 E)	6,000
Mill Creek	5,000
East Fork, Weiser River	15,000
Beaver Creek	7,000
Weiser River (Main Stream)	35,000
Warm Spring Creek	3,000
Lost Creek	30,000
West Fork, Weiser River	30,000
Mud Creek	12,000
Round Valley Creek	3,000
Boulder Creek	10,000
Little Salmon River Slope	6,000
Wildhorse Creek and Tributaries	150,000
Indian Creek	15,000
Snake River Slope	6,000
Rapid River and Tributaries	10,000
Other parts of Forest	25,000
Total	550,000

Table ~~31~~ .

Diameter Growth of Yellow Pine.

Weiser National Forest

Age on Stump Years	Diameter Breast high Inches	Diameter accretion by decades Inches	Basis No. of Trees	Basis per-cent	Diameter breast high Inches	Age on Stump Years	Years required to grow 1" diam.
80	19.8				20	81	
90	21.4	1.6	42		22	94	6.5
100	22.9	1.5			24	108	7.0
110	24.2	1.3		24	26	125	8.5
120	25.4	1.2	60		28	145	10.0
130	26.5	1.1		34	30	165	10.0
140	27.6	1.1			32	186	10.5
150	28.6	1.0			34	211	12.5
160	29.5	0.9	52		36	240	14.0
170	30.5	1.0		29½			
180	31.4	0.9					
190	32.3	0.9					
200	33.1	0.8					
210	33.9	0.8	22				
220	34.6	0.7					
230	35.3	0.7		12½			
240	36.0	0.7					

Basis 176 Trees grouped in 4 age classes of 42, 60, 52 and 22 trees respectively.

TABLE 32 .

WESTERN YELLOW PINE

Age on Diameter

Weiser National Forest, Idaho, 1910.

Diameter on Stump (Inches)	Age (Years)	Time Required to grow 1 inch (Years)	Diameter on Stump (Inches)	Age (Years)	Time Required to grow 1 inch (Years)	
1	6		21	109	5	Based on decade measurements on stump of 49 trees.
2	13	7	22	114	5	
3	18	5	23	120	6	
4	25	7	24	125	5	
5	31	6	25	131	6	
6	36	5	26	137	6	
7	42	6	27	142	5	
8	47	5	28	150	8	
9	52	5	29	158	8	
10	57	5	30	165	7	
11	62	5	31	174	9	
12	67	5	32	182	8	
13	72	5	33	191	9	
14	76	4	34	200	9	
15	81	5	35	210	10	
16	85	4	36	220	10	
17	90	5	37	230	10	
18	94	4	38	240	10	
19	99	5	39	250	10	
20	104	5	40	260	10	

Stumpheight - 18 inches

SAWTOOTH FOREST.

Yellow pine on this Forest forms but a small proportion of the total estimated stand, only 4.5%. The total for yellow pine is 39,000,000 feet B.M. on an approximate area of 19,507 acres. It is confined to the southwest part of the Forest, the greater part on the South Fork of the Boise River and Feather Creek with smaller bodies on Deer Creek and Lime Creek. A few scattered trees occur on Big and Little Smokey and Soldier Creeks.

The altitudinal range of yellow pine on this Forest is 4,000 to 6,000 feet, in general but in some places reaches 6,500 feet and slightly higher. The highest yellow pine is on south and wouthwest slopes.

Yellow pine on this Forest occurs on a number of similar formations as granite, porphyry, quartz and quartzite. Along the streams it is found on the wash from these formations. Near Grouse Creek summit it is observed on one small spot of basalt.

Douglas fir is the principal associate of yellow pine but is limited to north slopes and other moist sites in that type. In the upper limits lodgepole pine comes in to a small extent. Along the streams is an incidental mixture of cottonwood. These mixtures however, do not form a large proportion of the yellow pine type as the species occurs in pure stands. The type contains 90% yellow pine, the other

ten per cent is made up of Douglas fir, lodgepole pine and balsam poplar.

At the present time there is practically no utilization of yellow pine. Lumber will be the principal product with railroad ties and dimension stuff as special products if needed locally.

The management of the type on this Forest will not differ essentially from the general plan for Central Idaho yellow pine. The rotation for present purposes will be approximately 200 years. The cutting system will vary from single tree selection through group selection to the seed tree, according to the character of the stand and the favorableness of the particular site for the species. In the stands of scattered trees no cutting should be done unless restocking is well assured by established advance reproduction. In the mixtures, so far as there is a probability of increasing the proportion of yellow pine, it should be favored in cutting.

The general fire protection plan of the Forest will be sufficient for the type supplemented by careful brush disposal on exposed cuttings. No bark beetle infestation is reported and very little mistletoe damage is done.

TABLE 33.

Sawtooth National Forest

Western Yellow Pine

Watershed	M. Feet B.M.
Lime Creek	320
Deer "	200
Grouse Creek and adjacent Boise River	9,600
South Fork Boise River (From Willow Cr. up)	5,632
Marsh Creek	461
Shake "	150
Willow Creek	640
Elk Creek	8,000
Other parts of Forest	13,997
Total	39,000

CHALLIS FOREST

Yellow pine on this Forest forms only 1.6% of the total estimated stand of all species. It is confined to the western boundary along the middle Fork of the Salmon River and a few of the tributaries. The total stand is estimated at 17,000,000 feet B.M. on an approximate area of 7,808 acres. The greater part is restricted to the immediate slope of the Middle Fork with bodies of 50,000 to 100,000 feet B.M. Loon Creek and small bodies on Rapid River.

In elevation yellow pine ranges from the Middle Fork - 4,500 up to 6,000 feet on the tributaries. Where it occurs at the higher elevations it is on south slopes, ridges and rocky points.

The local formation on which this type is found is granite and porphyry.

Douglas fir is the principal associate with yellow pine. At the higher elevations and on the north slopes it is common in mixture. From the mouth of Thomas Creek to Rapid River this is noticeable but the remainder of the yellow pine areas on this Forest are in pure stands as it occurs on the more exposed and drier slopes where Douglas fir and other moisture requiring species do not thrive. Yellow pine is occasionally mixed with lodgepole pine and Engelmann sprtce but these mixtures are not important.

There is no utilization at the present as the stands of this species are remote and inaccessible. Lumber will of course be the principal product.

The management of the Challis yellow pine is planned on the basis of a tentative rotation of 200 years. The principal cutting methods indicated are the selection both single trees and small groups on the more unfavorable sites. On the north slopes, basins and other favorable sites the seed tree method will be the best adapted. Where the stand is reduced to scattered trees or in an extremely unfavorable place no cutting should be done unless there is a fair amount of well established advance reproduction present.

There are no special protective features to be considered for this type. No serious bark beetle infestation so far as is known threatens and the general fire protection plan for the Forest is sufficient for that danger.

TABLE 34.

Challis National Forest

Western Yellow Pine

Watershed	M. Feet B.M.
Middle Fork, Salmon River Drainage	
Main Middle Fork	14,000
Loon Creek	3,000
Total	17,000

Detailed maps of all the plots on which the report is based are attached. Trees 4" and over D.B.H. are designated by number; those under 4" D.B.H. and over 5 feet high are designated by a dot.

E. R. Hodson.

Forest Examiner.

Form 220

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

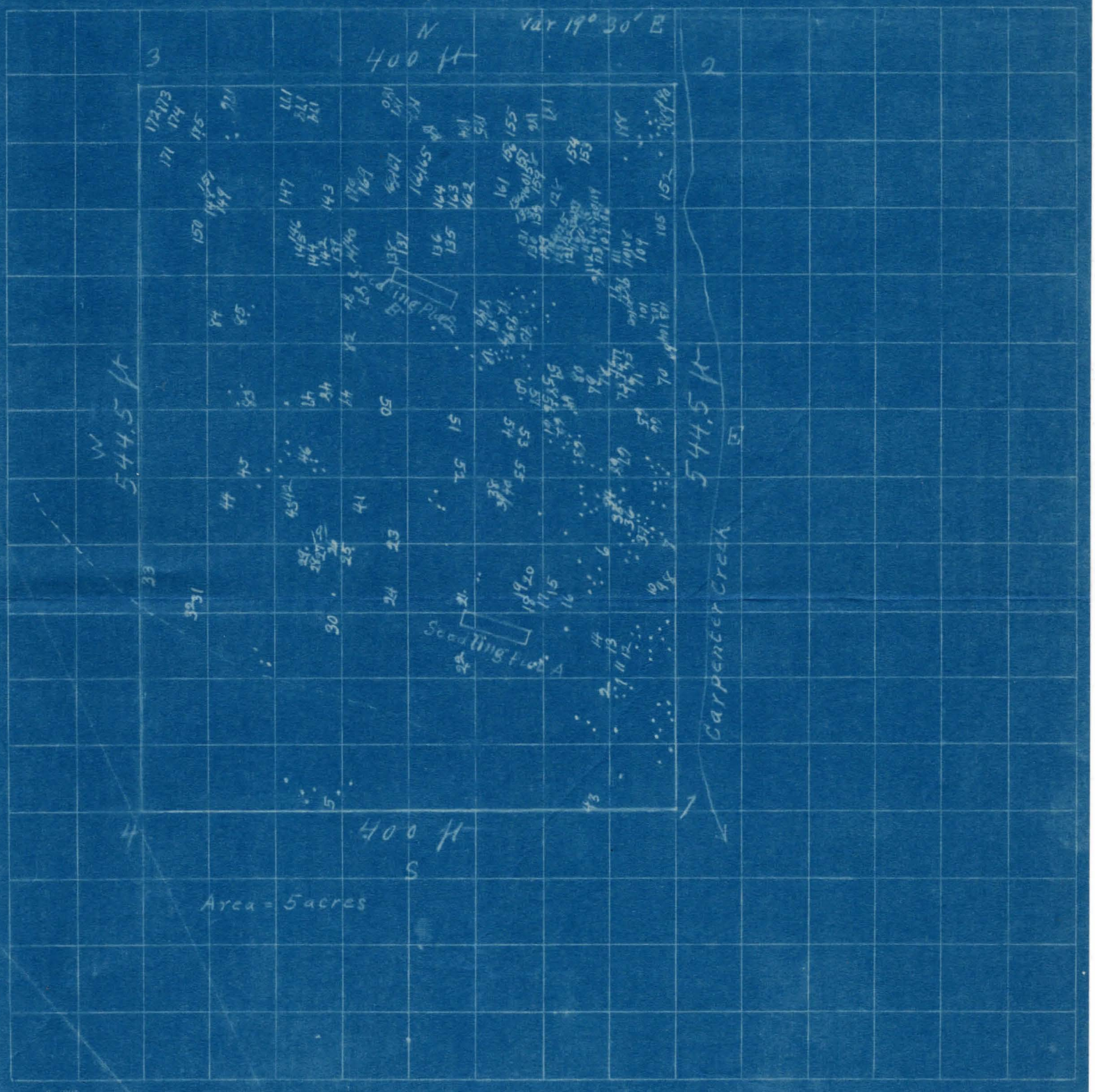
MAP SHEET

SI
Mc – 2 Payette No. Plot 1 Payette National Forest.

Division District , Block

T. 9 N. R. 5 E. Boise M., Section approx 33 , Quarter

Mapped by E R Hodson 4/29/13 Scale: 1 inch to 1 20 ft inches = 1 mile.



8—601

Form 220

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE

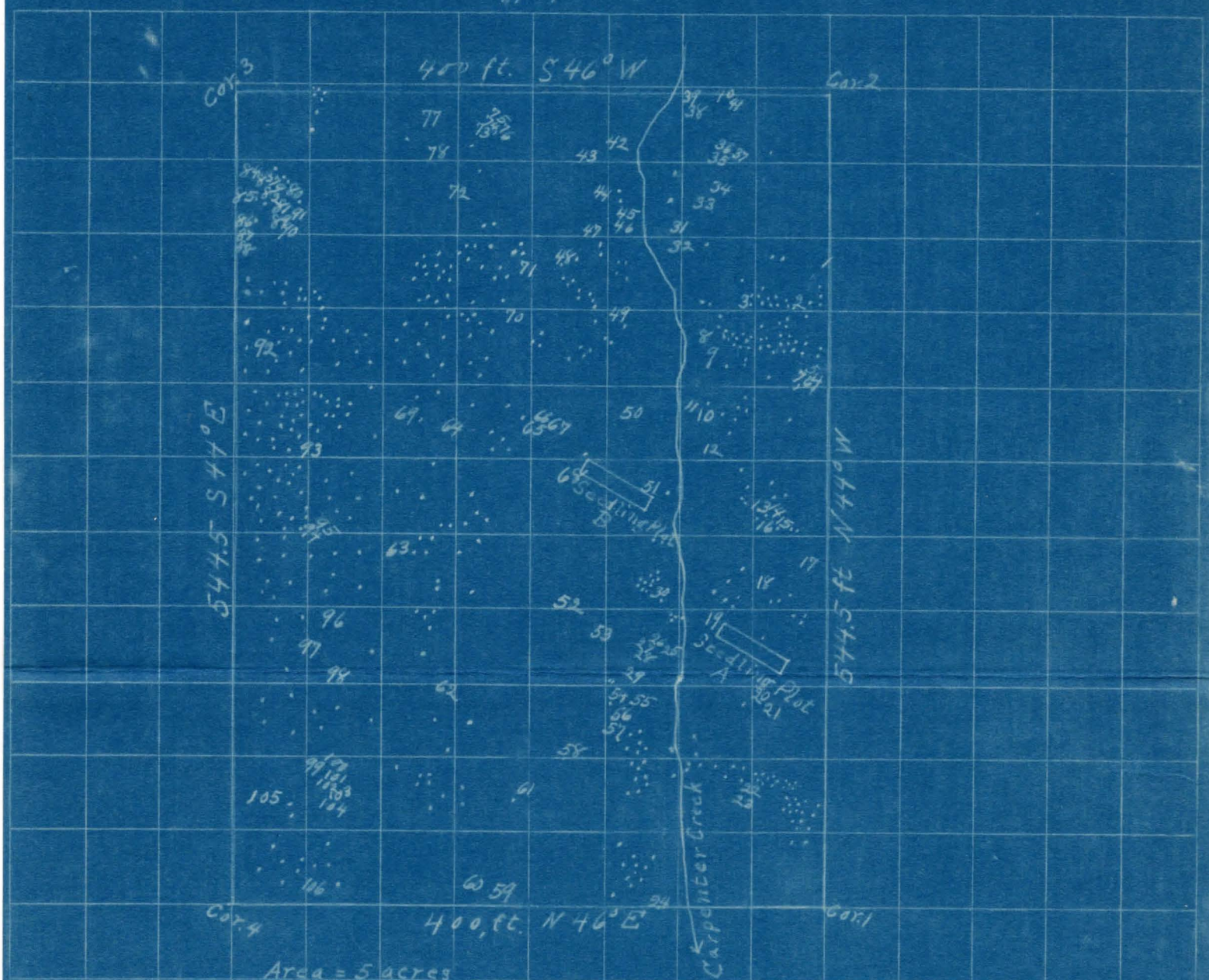
MAP SHEET

SI
Mc – 2, Payette No. Plot #2 — Payette National Forest.

Division ____ District ____, Block ____

T. 9N, R. 5E, Boise M., Section approx 28, Quarter ____

Mapped by E.R. Norton 9/6/13 Scale: 1 inch to 10 ft. inches = 1 mile.



8—601

Form 230

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

MAP SHEET

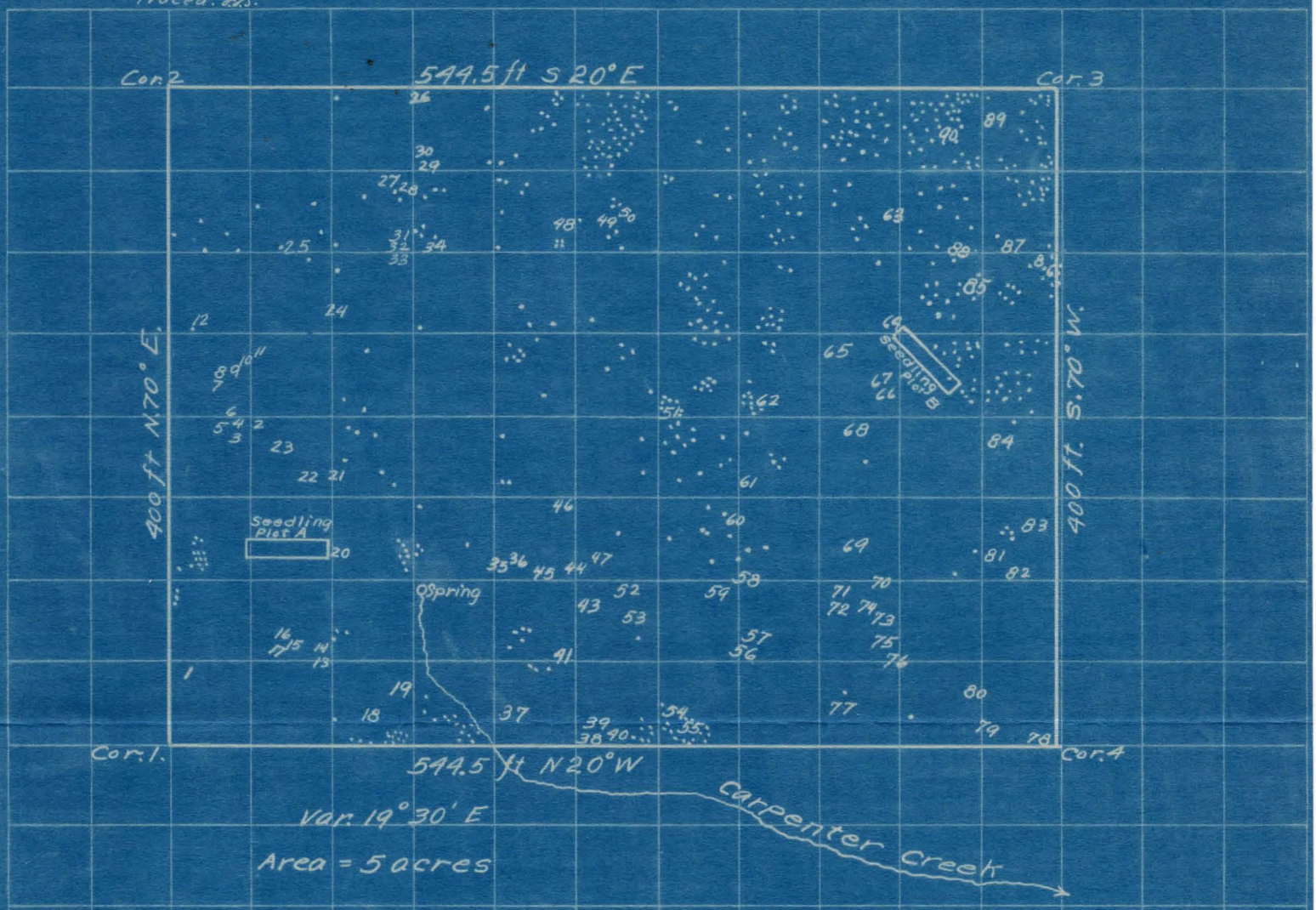
SI

Mc-2 Payette No. Plat #3 PAYETTE National Forest.

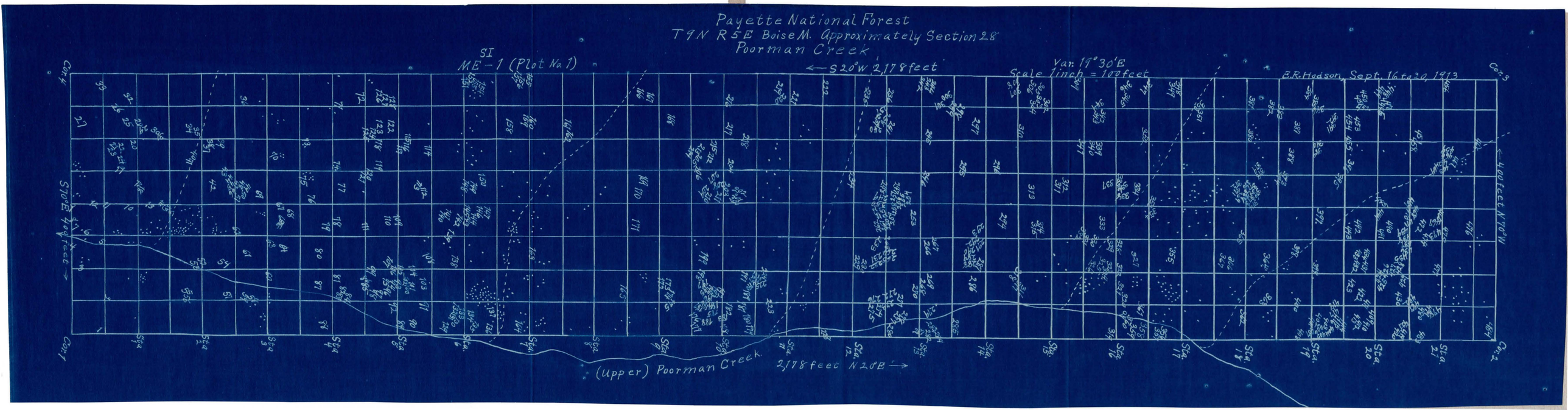
Division ..... District ....., Block .....

T. 9 N , R. 5 E , Boise M., Section Approx. 27 , Quarter .....

Mapped by E.R. Hodson 9/5/13 Scale: 1 inch = 100 feet
Traced. 225. inches = 1 mile.



8—001


Payette National Forest
T 9 N R 5 E Boise M. Approximately Section 28
Poorman Creek
SI
ME-1 (Plot No. 1)
← S 20° W 2,178 feet
Var. 19° 30' E
Scale 1 inch = 100 feet
E. R. Hodson, Sept. 16 to 20, 1913
Cor. 4
Cor. 3
Cor. 1
Cor. 2
S 10° E 400 feet →
← 400 feet N 10° W
Sta. 1
Sta. 2
Sta. 3
Sta. 4
Sta. 5
Sta. 6
Sta. 7
Sta. 8
Sta. 9
Sta. 10
Sta. 11
Sta. 12
Sta. 13
Sta. 14
Sta. 15
Sta. 16
Sta. 17
Sta. 18
Sta. 19
Sta. 20
Sta. 21
(Upper) Poorman Creek
2,178 feet N 20° E →